Castella is of opinion that the amount of wine produced in the colony will soon be very considerable. He recommends that the vine-growers of each district should agree among themselves to produce only one definite type of wine, and that it should be known by the name of the district—such as Rutherglen, Great Western, Bendigo, Mooroopna, and so forth. The label on a bottle would thus give some idea of the contents. To name wine from the sort of grape is useless. Two Rieslings—for instance, one grown on the Yarra and the other on the Murray —differ as much as hock and sherry.

MR. CLEMENT REID read an interesting paper the other evening before the Norfolk and Norwich Naturalists' Society on the natural history of isolated ponds. He selected as typical examples the isolated ponds dug on the South Downs to store water for cattle. These ponds are from 300 to 400 feet above sea-level, supplied by rain and condensation, and quite unconnected with any stream, often far from a road or path; and it appears most unlikely that seeds of the plants, or eggs of the animals, which he found in considerable numbers and variety, can have been conveyed thither by human agency. Both the eggs and the seeds must, he thinks, have been transported chiefly on the feet of birds.

MESSRS. LONGMANS have in the press and will shortly publish a new and revised edition of Sir Philip Magnus's "Lessons in Elementary Mechanics." The book, which has already passed through seventeen editions, has been entirely rewritten by the author. It contains several new sections, and especial attention has been given to the subject of units and to the explanations of terms. No change, however, has been made in the general arrangements of the book. A key containing full solutions of all the exercises and examination questions, many of which are new, is ready for press, and will be published about the same time as the new edition.

A BOOK by Prof. A. Targioni Tozzetti on the insects and other animals which injure tobacco has recently been published. Of his 300 pages of text, 270 are devoted to insects, 6 to vertebrates, 7 to snails, 10 to arachnids, and 1 to earthworms. Dealing with the cigarette beetle (*Lasioderma serricorne*), which, of all tobacco insects, does most damage in America, Prof. Tozzetti recommends as a remedy a thorough use of chloroform, bisulphide of carbon, and hydrocyanic acid gas in disinfecting warehouses and manufactories; and he advises, where possible, the submersion of the tobacco in 90 parts of water for forty-eight hours. *Insect Life* says of this advice that it is "evidently not based on experience, and not appreciative of the ease with which tobacco is spoiled for the trade."

IN the last sentence of Mr. Frederick J. Smith's letter on "A Simple Heat Engine" (NATURE, p. 294), *for* "fall" *read* "pull."

A SERIES of remarkable compounds of the halogen salts of the rare metal cæsium with two more atoms of chlorine, bromine, or iodine, are described by Messrs. Wells and Penfield in the January number of the *American Journal of Science*. The fact was accidentally discovered that when bromine is added to a concentrated solution of cæsium chloride, CsCl, a dense bright-yellow precipitate is produced. When the contents of the test-tube are warmed, this precipitate dissolves, but on cooling the same substance separates out in the form of large orange-coloured crystals. Upon analysis these crystals are found to possess the composition $CsClBr_2$. This remarkable observation has led to the preparation of a series of eight such salts, each containing one atom of cæsium and three halogen atoms. The formulæ of these compounds are CsI_3, $CsBrI_2$, $CsBr_2I$, CsClBrI, $CsCl_2I$, $CsBr_3$, $CsClBr_2$, and $CsCl_2Br$. They all crystallize well, generally in large brilliant prisms. Those of CsI_3 are black and almost opaque; those of $CsBrI_2$ dark reddish-brown by reflected and deep red by transmitted light; $CsBr_2I$ forms crystals of a bright cherry-red colour; while the crystals of CsClBrI, $CsBr_3$, and $CsClBr_2$ are tinted with various shades of orange. The compound $CsCl_2Br$ forms bright yellow crystals, the lightest coloured in the whole series. Two other possible salts of the series, $CsClI_2$ and $CsCl_3$ have not yet been obtained. The general method by which the above eight salts were prepared consisted in dissolving the haloid salt of cæsium employed in water, adding the requisite quantity of iodine or bromine, or leading a stream of chlorine through the solution, and cooling or evaporating to the crystallizing point. The salts are remarkably stable, they may all be preserved for any length of time in corked tubes or bottles. They form an isomorphous group, all crystallizing in the rhombic system. An important relation has been discovered between the crystallographical constants of the first five members of the series, those containing iodine. The ratio of two of the axes remains almost constant throughout the whole of the five, while the third varies with the molecular weight.

THE formation of salts of the nature above described, in which a compound such as cæsium chloride, which is usually considered as fully saturated, actually combines directly with two more atoms of a monad halogen element, is a most important and interesting fact considered in connection with the general subject of residual affinity. Cæsium, as is well known, is the most electro-positive element yet discovered, and that it should exhibit this phenomenon of residual affinity in so startling a manner is perhaps not surprising. Moreover, Johnson in the year 1877 obtained a tri-iodide of potassium, KI_3, and also in 1878 an analogous ammonium compound, NH_4I_3. The question of the constitution of such salts is a most complex one, but the balance of evidence, particularly that afforded by the crystallographical measurements, is decidedly in favour of considering them as double salts, and not as salts of trivalent cæsium. The acceptance of a possible trivalency of cæsium would of course be in direct antagonism to the teaching of the periodic generalization, and Prof. Mendeleeff himself considers the two extra atoms of iodine in potassium tri-iodide to be united much in the same manner as the water taken up by many salts upon crystallization.

THE additions to the Zoological Society's Gardens during the past week include a Grey Ichneumon (*Herpestes griseus* ♂) from India, presented by Mr. R. Meinertzhagen; a Lesser White-nosed Monkey (*Cercopithecus petaurista* ♀) from West Africa, deposited; two Snow Buntings (*Plectrophanes nivalis*), a Yellow Bunting (*Emberiza citrinella*), two Reed Buntings (*Emberiza schœniclus*), British, purchased; seven Coypus (*Myopotamus coypus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

NEW STAR IN THE MILKY WAY.—The following circular was issued from the Royal Observatory, Edinburgh, 1892, February 2:—

Yesterday an anonymous post-card was received here bearing the following communication:—

"*Nova* in Auriga. In Milky Way, about two degrees south of χ Aurigæ, preceding 26 Aurigæ. Fifth magnitude, slightly brighter than χ."

At 6h. 8m. G.M.T. the star was easily found with an opera-glass. It was of a yellow tint, and of the sixth magnitude, being equal to 26 Aurigæ. Examined with a prism between the eye and the eye-piece of the 24-inch reflector, it was immediately seen to possess a spectrum very like that of the Nova of 1866. The C-line was intensely bright, a yellow line about D fairly visible; four bright lines or bands were conspicuous in the green; and, lastly, a bright line in the violet (probably $H\gamma$) was easily seen.

A telegraphic notice was sent to Greenwich in the afternoon,

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and later on, when the true nature of the object was recognized, to Kiel for general distribution. The star was photographed last night at Greenwich.

Its place for 1892·0 is 5h. 25m. 3s. + 30° 21′. It does not occur in the Bonn Maps. Ralph Copeland.

Observations of Mars.—*Publikationen des Astrophysikalischen Observatoriums zu Potsdam*, No. 28, contains the results of some observations of Mars, made by Dr. Lohse during the oppositions of 1883-84, 1886, and 1888. A series of measurements of the position-angle of the northern snow-cap has been made with the idea of accurately determining the direction of the polar axis of the planet. On February 8, 1884, the mean value obtained differed from Dr. Marth's ephemeris by 0°·216, being identical with that deduced from the corrected elements of the axis employed after 1884. In 1888 the distance of the centre of the northern snow-cap from the Pole was found to be 2°·39, and the mean correction of position-angle 0°·896. Reproductions of thirty-six sketches of Mars made in 1884 and 1886 accompany the paper. These show the principal markings, but not the canals and minute details seen by that perspicacious astronomer Schiaparelli, although the instrument used was an 11-inch refractor. The sketches are combined to form a map, on which the position determined with special accuracy is indicated.

At the conjunction of Mars and Jupiter, in October 1883, a determination was made of the comparative intensities of the actinic rays emitted by the two planets. A series of photographs of these bodies was taken with exposures varying from one to twelve seconds, and these were compared with a scale derived from a series taken with an artificial source of light at various distances, and another derived from Vega. The actinic intensity of Jupiter's southern hemisphere was found to be 2·176 times greater than that of the Martian surface, which, when the distances of the two planets from the sun are taken into account, gives 24·4 : 1 as the relative albedos. The ratio of the amount of light emitted by the southern hemisphere of Jupiter to that emitted by the northern hemisphere was incidentally found to be as 1·192 : 0·597.

Solar Prominence Photography.—Some interesting recent results in the photography of solar prominences are stated by Prof G. E. Hale in the first number of *Astronomy and Astro-Physics*. In the first place, the line a little less refrangible than H, which Prof. Hale suggested was probably due to hydrogen, has been proved by M. Deslandres to have its origin in this element, by direct comparison with a Geissler tube. Prof. Young has also succeeded in photographing this line, which was first visually observed by him in 1880. With regard to the line at λ 3888·73, which forms a double with the hydrogen line α (λ 3889·14) of the stellar series, Prof. Young has not found the duplicity which very often distinguishes the Kenwood Observatory photographs. The hydrogen line α occurs on eighteen plates, but it is only certainly single on two of them. And it is a significant fact that in one of these cases only the upper part of the prominence lines was photographed, the light from a short distance above the sun's limb being cut off by a diaphragm. There seems little doubt that the line is a true one, and not a false appearance brought about by the reversal of the hydrogen line on account of which it is apparently duplicated. Its origin, however, is unknown. Prof. Hale thinks that both H and K in prominences are due to calcium, the absence of the strong line at λ 4226·3 being said to follow from its different appearance and behaviour in the arc, as compared with H and K. By a remarkable coincidence an eruption on July 9, 1891, was simultaneously photographed at Kenwood Observatory and visually observed by Herr Fènyi at Kalosca, Hungary. Copies are given of the drawing and photograph, and the general agreement in the form of the prominence is very striking.

Re-discovery of Brooks's Comet (1890 II.).—A telegram from M. Perrotin to Prof. Krueger announces that Brooks's comet was found by M. Javelle, of Nice Observatory, on January 6 (*Astr. Nach.* 3074).

ELECTROTECHNICS.[1]

I beg to thank you for the great honour you have done me in electing me your President for this year—a year which the need for a new complete index of this Society's Journal marks out as closing the second decade of its life; a year which sees the second thousand added to our roll of members; and a year which the Electrical Exhibition at the Crystal Palace distinguishes as inaugurating the second decade of electric lighting in Great Britain.

It has gradually become the custom for your incoming President to select, as the subject of his address, some investigation that has been engaging his attention. Following this custom, I purpose to-night to discuss an experiment in which, for the last nineteen years, I have taken some part—an experiment which, of all others, has been the one I have had most at heart—and that is, how best to train the young electrical engineer.

To some it may appear that I am treading on well-worn ground; but as the problem is one that is as yet by no means solved, and as it involves the preparation of the machine that is daily used alike by the dynamo constructor, the cable manufacturer, the central station engineer, and the lamp maker—viz. the human machine—the problem of fashioning this tool so that it may possess sharpness, an even temper, moral strength, and a mental grain capable of taking a high polish, is one that, in truth, deeply concerns every member, every associate, every student of this Society.

It is only fifteen years ago since I wrote from Japan to my old and valued master, Dr. Hirst, then the Principal of the Royal Naval College, Greenwich, asking whether he thought that the time had come for starting in this country a course of applied physics somewhat on the lines of that given at the Imperial College of Engineering in Japan. He replied that England was not yet ripe for such an innovation—an opinion which appeared to be borne out by the fact that after the authorities at University College, London, had in 1878 actually advertised for applications for a new chair of "Technology," they decided that it would be premature to take the responsibility of creating such a Professorship.

But matters were advancing more rapidly than was imagined by collegiate bodies; for in that same year this most valuable report on technical education which I hold in my hand was issued by a Committee of the Livery Companies of London, based on the opinions expressed by Sir W. (now Lord) Armstrong, Mr. G. C. T. Bartley, Colonel (now General) Donelly, Captain (now Sir Douglas) Galton, Prof. Huxley, and Mr. (now Sir H. Truman) Wood. And although it is twelve years since this book was published, I can recommend it to your notice, for it supplies most interesting reading even at the present day.

Under the guidance of three joint honorary secretaries, Mr. John Watney, Mr. Sawyer, and Mr. (now Sir Owen) Roberts, the City and Guilds of London Institute for the Advancement of Technical Education started, with a name that was very long, but in a way that was very modest, to develop a "Trades School" in accordance with this report. They borrowed some rooms, but for use in the evening only, from the Middle Class Schools in Cowper Street, Finsbury, and decided to erect ultimately a chemical laboratory in that neighbourhood.

But neither the building of a physical nor even of a mechanical laboratory formed any part of the scheme for this "Local Trades School." For at that time the teaching of the applications of physics to industry hardly existed, and certainly not its application to any electrical industry other than telegraphy. To make a start, however, in such teaching was most desirable, and therefore Dr. Wormell, the enlightened head master of the Cowper Street Schools, consented to give up the use of some rooms not merely during the evening, but also during the day, to enable Dr. Armstrong and myself to carry out our plan of fitting up students' laboratories with a small amount of apparatus kept permanently ready in position.

For the devotion of these rooms to the carrying out of this new experiment we must always feel grateful to Dr. Wormell, for it was necessarily accompanied by a reduction in the size of his school, and consequently by a pecuniary loss to himself.

The first laboratory course of the City and Guilds Institute was then advertised, and on January 9, 1880, three students presented themselves—a little boy, a gray-haired lame man, and a middle-aged workman with emphatic but hazy notions about the electric fluid.

In order to further utilize these rooms, the Institute sanctioned laboratory teaching during the day, and one of the cellars of the Cowper Street Schools was borrowed in order to fit up a gas-engine, coned shafting, and a transmission dynamometer, obtained out of the funds of the Institute; an A Gramme dynamo

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[1] Inaugural Address of Prof. W. E. Ayrton, F.R.S., President of the Institution of Electrical Engineers, delivered on January 28, 1892.

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